

We claim:

1. A method for determining whether a cell has incorporated and expresses a polynucleotide, the method comprising:

5 introducing to a cell a construct comprising a polynucleotide encoding an enzyme having organophosphate hydrolase activity;

contacting the cell with an organophosphate such that if the cell does not contain the construct and an enzyme having organophosphate hydrolase activity is not thereby produced, the cell growth is inhibited,

10 thereby determining whether the cell has incorporated the polynucleotide.

2. The method of claim 1, wherein the organophosphate is selected from the group consisting of acephate, azinophos-methyl, demeton-S-methyl,

15 malathion, phosalone, amiprofos-methyl, bensulide, butamiphos, piperophos, paraoxon, DFP, coumaphos, soman, and VX.

3. The method of claim 1, wherein the organophosphate is bensulide.

20 4. The method of claim 1, wherein the polynucleotide is SEQ ID NO:1.

5. The method of claim 1, wherein the cell is selected from the group consisting of a plant cell, an animal cell, and a fungal cell.

25 6. The method of claim 5, wherein the plant cell is a maize plant cell.

7. A method for determining whether a cell has incorporated and expresses a polynucleotide, the method comprising:

introducing to a cell a construct comprising a polynucleotide encoding an enzyme having organophosphate hydrolase activity;

contacting the cell with an organophosphate such that if the cell contains the construct and an enzyme having organophosphate hydrolase activity is thereby expressed, the enzyme having organophosphate hydrolase activity hydrolyzes the organophosphate; and

detecting the hydrolysis, thereby determining whether the cell has incorporated a polynucleotide.

8. The method of claim 7, wherein the organophosphate is selected from the group consisting of acephate, azinophos-methyl, demeton-S-methyl, malathion, phosalone, amiprofos-methyl, bensulide, butamiphos, piperophos, paraoxon, DFP, coumaphos, soman, and VX.

9. The method of claim 7, wherein the organophosphate is amiprofos-methyl.

10. The method of claim 7, wherein the polynucleotide is SEQ ID NO:1.

11. The method of claim 7, wherein the cell is selected from the group consisting of a plant cell, an animal cell, a bacterial cell, and a fungal cell.

12. The method of claim 11, wherein the plant cell is a maize plant cell.

13. A method for determining whether a cell has incorporated a first
5 polynucleotide, the method comprising:

introducing to a cell a construct comprising a first polynucleotide and a
second polynucleotide, wherein the second polynucleotide encodes an enzyme
having organophosphate hydrolase activity;

contacting the cell with an organophosphate such that if the cell does
10 not contain the construct and an enzyme having organophosphate hydrolase
activity is not thereby produced, the cell growth is inhibited,

thereby determining whether the cell has incorporated a first
polynucleotide.

14. The method of claim 13, wherein the organophosphate is selected from
15 the group consisting of acephate, azinophos-methyl, demeton-S-methyl,
malathion, phosalone, amiprofos-methyl, bensulide, butamiphos, piperophos,
paraoxon, DFP, coumaphos, soman, and VX.

15. The method of claim 13, wherein the organophosphate is bensulide.
20

16. The method of claim 13, wherein the second polynucleotide is SEQ ID
NO:1.

17. The method of claim 13, wherein the cell is selected from the group consisting of a plant cell, an animal cell, and a fungal cell.

18. The method of claim 17, wherein the plant cell is a maize plant cell.

5

19. A method for determining whether a cell has incorporated a first polynucleotide, the method comprising:

introducing to a cell a construct comprising a first polynucleotide and a second polynucleotide, wherein the second polynucleotide encodes an enzyme having organophosphate hydrolase activity;

10

contacting the cell with an organophosphate such that if the cell contains the construct and an enzyme having organophosphate hydrolase activity is thereby expressed, the enzyme having organophosphate hydrolase activity hydrolyzes the organophosphate; and

15

detecting the hydrolysis,

thereby determining whether the cell has incorporated a first polynucleotide.

20

20. The method of claim 19, wherein the organophosphate is selected from the group consisting of acephate, azinophos-methyl, demeton-S-methyl, malathion, phosalone, amiprofos-methyl, bensulide, butamiphos, piperophos, paraoxon, DFP, coumaphos, soman, and VX.

25

21. The method of claim 19, wherein the organophosphate is amiprofos-methyl.

22. The method of claim 19, wherein the second polynucleotide is SEQ ID NO:1.

5 23. The method of claim 19, wherein the cell is selected from the group consisting of a plant cell, an animal cell, a bacterial cell, and a fungal cell.

24. The method of claim 23, wherein the plant cell is a maize plant cell.

10 25. The method of claim 1, wherein the cell does not naturally contain an enzyme having significant organophosphate hydrolase activity, and wherein the cell is a plant cell.

26. The method of claim 25, wherein the plant cell is a maize plant cell.

15

27. The method of claim 7, wherein the cell does not naturally contain an enzyme having significant organophosphate hydrolase activity, and wherein the cell is a plant cell.

20 28. The method of claim 27, wherein the plant cell is a maize plant cell.

29. The method of claim 13, wherein the cell is a plant cell.

30. The method of claim 29, wherein the plant cell is a maize plant cell.

25

31. The method of claim 19, wherein the cell is a plant cell.

32. The method of claim 31, wherein the plant cell is a maize plant cell.

5 33. A method for determining the presence of absence of a polynucleotide in a cell comprising:

introducing into a cell an expression construct comprising a polynucleotide as set forth in SEQ ID NO:1, wherein said polynucleotide encodes an enzyme having organophosphate hydrolase activity;

10 contacting said cell with an organophosphate; and

analyzing for the presence of hydrolysis detected by a method selected from spectrophotometry, fluorescence and phosphorescence.

15 34. The method of claim 33, wherein the organophosphate is selected from the group consisting of acephate, azinophos-methyl, demeton-S-methyl, malathion, phosalone, amiprofos-methyl, bensulide, butamiphos, piperophos, paraoxon, DFP, coumaphos, soman, and VX.

20 35. The method of claim 33, wherein the organophosphate is amiprofos-methyl.

36. The method of claim 33, wherein the cell is selected from the group consisting of a plant cell, an animal cell, a bacterial cell and a fungal cell.

25 37. The method of claim 33, wherein the cell is a maize plant cell.

38. The method of claim 33, wherein hydrolysis is detected by spectrophotometry.

5 39. The method of claim 33, wherein hydrolysis is detected by fluorescence.

40. The method of claim 33, wherein hydrolysis is detected by phosphorescence.